

May 2023 Monthly Compliance Report

Solid Waste Permit No. 221
Bristol Integrated Solid Waste Management Facility
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INTRODUCTION

On behalf of the City of Bristol, Virginia (City), SCS Engineers (SCS) has prepared this report to the Virginia Department of Environmental Quality (VDEQ). This report covers the Solid Waste Permit (SWP) No. 221 Landfill during the month of April.

The following sections outline actions completed towards the applicable items in Appendix B of the Consent Decree. The sections have been numbered to align with the numbering in Appendix B.

2.0 COVER INTEGRITY AND EXPOSED WASTES

As outlined in Appendix B of the Consent Decree, cover integrity of the SWP No. 221 Landfill will be managed primarily through ongoing surface emissions monitoring in accordance with Federal and State regulations.

2.3 SURFACE EMISSIONS MONITORING

On October 12, 2022, SCS performed surface emissions monitoring (SEM) on the landfill. During the monitoring event no exceedances were detected on the serpentine route or at pipe penetrations. Details of the surface emissions monitoring were included in the October 2022 Monthly Compliance Report for the SWP No. 221 Landfill and in a letter outlining the results submitted to VDEQ on October 28, 2022.

The 2023 Annual SEM Event will be performed later this year.

3.0 GAS COLLECTION

The City has taken steps to optimize gas collection and minimize air intrusion as outlined in the sections below.

3.1 SYSTEM OPTIMIZATION

There are currently 15 vertical extraction wells in the SWP No. 221 Landfill Area (Well Nos. 1 – 15). In waste disposal units where the age of the buried wastes is greater than 40 years, as is the case at SWP No. 221 Landfill, the rate and quantity of decomposition gas production declines significantly compared to the rate and quantity of LFG generated in more recently buried wastes. However, some of these devices will show normal methane ranges and are tuned accordingly. There is no historical evidence of elevated temperatures in the SWP No. 221 Landfill. Also, the No. 221 Landfill Area is not believed to be a significant source of fugitive LFG emissions or odors.

Each month, adjustments are made during wellfield monitoring to optimize gas quality and applied vacuum on the Area 221 wells. All Area 221 wells show consistent and normal vacuum. During the May monitoring event, adjustments were made as necessary to tune the recently installed 1-inch wellheads on all extraction wells in Area 221. The average gas composition in the Area 221 wells is shown in Table 1. Average Methane content for the Area 221 wells has decreased slightly where Carbon Dioxide and Oxygen have stayed relatively consistent for the month after tuning was performed.

Landfill gas constituent concentrations in the SWP No. 221 wells appear to be highly sensitive to subtle wellhead control valve adjustments, which correlates to changes in applied vacuum. There are

occasionally substantial fluctuations in the LFG composition quality (high methane and low nitrogen versus exhibiting lower methane and higher nitrogen) that coincide with relatively slight (say less than 5 percent) changes in the applied vacuum. SCS-FS technicians have been fine tuning the wellheads to optimize gas concentrations and flows. Gas composition and a summary of adjustments made to individual wells are listed in Appendix A.

Table 1. Monthly Average Wellhead LFG Composition – SWP No. 221 Well

Month	Average CH ₄ (% Vol)	Average CO ₂ (% Vol)	Average O ₂ (% Vol)	Average Pressure (inches w.c.)
November 2022	47.4	33.7	3.3	-11.9
December 2022	58.7	39.6	0.3	-2.7
January 2023	39.8	27.0	6.0	-20.6
February 2023	42.5	28.1	7.2	-15.6
March 2023	53.5	33.6	2.9	-20.4
April 2023	56.7	35.2	1.2	-20.7
May 2023	52.9	35.4	1.8	-18.8

3.2 OPTIMIZATION PLAN AND REPORTING

3.2.1 Optimization Plan


On December 1, 2022, on behalf of the City, SCS submitted a plan that provides for means and methods for optimizing the performance of the existing gas extraction system in the Solid Waste Permit No. 221 landfill. Additional details about that plan were included along with a copy of the plan in the November 2022 Monthly Compliance Report for the SWP No. 221 Landfill.

3.2.2 Optimization Actions

During the month of January 2023 actions were taken to implement the submitted Optimization Plan. The actions taken at the SWP No. 221 Landfill in accordance with the plan were summarized in the January 2023 Monthly Compliance Report for the SWP No. 221 Landfill. SCS prepared a report that detailed the results of each of these activities and the report was submitted to VDEQ on February 1, 2023.

3.2.3 Monthly Wellhead Monitoring

On May 1, 2023 and May 2, 2023, SCS Field Services (SCS-FS) visited the landfill and performed monitoring of the landfill gas wells. The results of the monthly monitoring were submitted to VDEQ on June 7, 2023 and are included in Appendix A.



Appendix A
May Monthly Wellhead Monitoring Data

Bristol Virginia Landfill - Permit 221 Well Data - 03/01/2023 to 05/31/2023

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H2O)	Temp (F)	System Pressure ("H2O)	Comments
01	3/1/2023 09:32	59.7	36.0	0.9	3.4	-20.7	-20.8	67.8	-21.1	Increased Flow/Vacuum
01	3/7/2023 09:22	62.0	38.0	0.0	0.0	-21.1	-21.0	72.6	-21.0	Opened Valve 1/2 Turn or Less
01	3/13/2023 08:48	61.8	37.1	0.8	0.3	-22.9	-22.8	46.1	-22.8	Increased Flow/Vacuum
01	4/3/2023 09:53	60.4	37.0	0.0	2.7	-22.4	-22.4	55.7	-22.6	Valve Adjustment:Valve completely open
01	5/1/2023 10:18	57.5	39.0	0.0	3.5	-22.5	-22.4	53.2	-22.5	No Change, Fully Open
02	3/1/2023 09:36	50.9	31.1	3.6	14.4	-21.1	-21.1	61.3	-21.2	No Change
02	3/7/2023 09:26	37.4	23.4	7.9	31.3	-21.0	-20.3	63.9	-21.0	Decreased Flow/Vacuum
02	3/13/2023 11:22	66.0	33.7	0.3	0.0	-10.3	-13.3	47.3	-22.8	Increased Flow/Vacuum
02	4/3/2023 09:56	60.6	37.2	0.1	2.1	-22.6	-22.4	55.6	-22.6	Valve Adjustment:Opened Valve 1/2 to 1 turn
02	5/1/2023 10:21	58.8	38.8	0.0	2.5	-22.3	-22.3	52.2	-22.4	Valve Adjustment: Open Valve 1/2 to 1 turn
03	3/1/2023 09:42	52.7	33.1	2.8	11.4	-21.2	-21.2	62.7	-21.1	No Change
03	3/7/2023 09:29	36.7	23.4	8.0	31.9	-21.1	-21.0	66.1	-21.0	Decreased Flow/Vacuum
03	3/13/2023 11:17	54.2	33.9	2.9	9.0	-23.0	-22.9	46.8	-23.0	Increased Flow/Vacuum
03	4/3/2023 10:00	55.0	34.6	1.7	8.7	-22.4	-22.4	56.6	-22.5	Valve Adjustment:Opened Valve 1/2 to 1 turn
03	5/1/2023 10:24	57.5	38.1	0.5	4.0	-22.2	-22.2	52.3	-22.4	Valve Adjustment: Open Valve 1/2 to 1 turn
04	3/1/2023 09:51	60.2	39.8	0.0	0.0	-18.1	-18.1	67.7	-21.0	Increased Flow/Vacuum
04	3/1/2023 09:55	59.6	38.6	0.4	1.4	-20.5	-20.9	72.5	-20.9	Increased Flow/Vacuum
04	3/1/2023 09:56	60.2	38.7	0.1	1.0	-21.0	-21.0	71.5	-21.1	Increased Flow/Vacuum
04	3/7/2023 09:36	53.4	35.8	2.5	8.3	-21.2	-21.1	74.5	-21.0	No Change
04	3/13/2023 11:14	59.6	39.9	0.6	0.0	-23.0	-23.0	48.9	-23.1	Increased Flow/Vacuum
04	4/3/2023 10:08	57.8	39.9	0.0	2.3	-22.3	-22.3	58.6	-22.6	Valve Adjustment:Valve completely open
04	5/1/2023 10:27	56.4	41.3	0.0	2.4	-21.9	-21.9	53.0	-22.4	No Change, Fully Open
05	3/1/2023 10:01	59.4	39.4	0.2	1.0	-20.6	-20.9	65.9	-21.1	Increased Flow/Vacuum
05	3/7/2023 09:40	30.4	21.5	9.9	38.2	-21.2	-21.1	73.0	-21.1	Decreased Flow/Vacuum
05	3/13/2023 11:06	53.2	36.0	2.5	8.3	-23.0	-22.9	49.9	-23.0	No Change
05	4/3/2023 10:11	56.3	37.4	0.4	5.8	-22.3	-22.3	57.4	-22.6	Valve Adjustment:Opened Valve 1/2 to 1 turn
05	5/1/2023 08:42	58.1	40.9	0.0	1.0	-22.4	-22.4	54.0	-22.5	Valve Adjustment: Open Valve 1/2 to 1 turn
06	3/1/2023 08:49	63.7	34.0	0.7	1.6	-21.5	-21.7	60.9	-21.7	Increased Flow/Vacuum
06	3/1/2023 08:52	64.7	35.3	0.0	0.0	-21.8	-21.8	61.5	-21.7	Increased Flow/Vacuum
06	3/7/2023 08:43	65.0	34.0	0.9	0.1	-21.1	-21.1	65.9	-21.1	No Change
06	3/13/2023 08:06	34.8	20.4	9.0	35.8	-22.6	-22.5	45.2	-22.6	Decreased Flow/Vacuum
06	4/3/2023 09:23	45.9	25.0	6.1	23.1	-22.3	-22.3	54.2	-22.6	No Change
06	5/1/2023 08:48	36.6	23.9	7.8	31.8	-22.1	-22.2	55.9	-22.5	Valve adjustment: Closed Valve 1/2 to 1 turn

Bristol Virginia Landfill - Permit 221 Well Data - 03/01/2023 to 05/31/2023

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H2O)	Temp (F)	System Pressure ("H2O)	Comments
07	3/1/2023 08:55	59.3	40.7	0.0	0.0	-4.7	-8.7	65.6	-21.3	Increased Flow/Vacuum
07	3/7/2023 08:47	60.0	40.0	0.1	0.0	-15.7	-16.4	69.6	-20.9	Increased Flow/Vacuum
07	3/13/2023 08:11	57.8	38.4	1.0	2.8	-19.1	-20.1	47.8	-22.7	Increased Flow/Vacuum
07	4/3/2023 09:26	59.1	33.6	0.0	7.3	-20.4	-21.0	55.7	-22.7	Valve Adjustment: Opened Valve 1/2 to 1 turn
07	5/1/2023 08:51	55.6	37.1	0.0	7.3	-20.2	-20.1	56.6	-22.5	Valve Adjustment: Open Valve 1/2 to 1 turn
08	3/1/2023 09:00	51.0	30.8	3.6	14.6	-20.4	-21.0	69.9	-20.9	Increased Flow/Vacuum
08	3/7/2023 08:52	63.0	36.3	0.7	0.0	-21.0	-21.0	73.3	-20.9	Increased Flow/Vacuum
08	3/13/2023 08:15	24.4	15.7	12.7	47.2	-22.5	-14.2	46.8	-22.5	Decreased Flow/Vacuum
08	4/3/2023 09:29	36.1	22.7	8.6	32.5	-19.7	-19.3	53.2	-22.6	Valve Adjustment: Closed valve 1/2 to 1 turn
08	5/1/2023 08:59	61.0	37.9	0.0	1.1	18.2	18.5	50.2	-22.4	Valve Adjustment: Open Valve 1/2 to 1 turn
08	5/2/2023 09:51	25.8	20.1	12.0	42.1	-17.3	-16.7	62.3	-22.7	Valve Adjustment: Closed Valve 1/2 to 1 turn
09	3/1/2023 09:10	60.7	39.3	0.0	0.0	-21.2	-21.1	69.3	-21.1	Increased Flow/Vacuum
09	3/7/2023 09:01	7.0	5.0	19.2	68.8	-21.0	-21.0	72.0	-20.9	Decreased Flow/Vacuum
09	3/13/2023 08:22	35.8	24.8	8.3	31.1	-22.5	-21.2	44.9	-22.6	No Change
09	4/3/2023 09:36	57.1	36.0	1.0	5.9	-18.3	-21.0	54.4	-22.6	Valve Adjustment: Opened Valve 1/2 to 1 turn
09	5/1/2023 10:06	57.4	36.7	0.6	5.4	-22.2	-22.1	55.1	-22.3	Valve Adjustment: Open Valve 1/2 to 1 turn
10	3/1/2023 09:13	58.8	40.0	0.2	1.0	-21.2	-21.1	66.4	-21.0	Increased Flow/Vacuum
10	3/7/2023 09:06	38.4	27.8	6.8	27.0	-21.1	-21.0	70.0	-20.9	Decreased Flow/Vacuum
10	3/13/2023 08:36	58.4	40.4	0.6	0.6	-22.6	-22.6	46.0	-22.6	Increased Flow/Vacuum
10	4/3/2023 09:39	58.5	38.7	0.0	2.8	-22.7	-22.7	54.0	-22.6	Valve Adjustment: Opened Valve 1/2 to 1 turn
10	5/1/2023 10:08	54.9	36.7	0.0	8.4	-22.2	-22.2	52.8	-22.1	Valve Adjustment: Open Valve 1/2 to 1 turn
11	3/1/2023 09:23	60.3	37.0	0.6	2.1	-21.1	-21.1	64.8	-21.1	Opened Valve 1/2 Turn or Less
11	3/7/2023 09:15	56.7	34.3	2.0	7.0	-21.0	-21.0	69.7	-21.0	No Change
11	3/13/2023 08:41	22.3	15.3	13.8	48.6	-22.7	-19.7	44.9	-22.6	Decreased Flow/Vacuum
11	4/3/2023 09:47	60.8	38.5	0.0	0.7	-1.8	-4.0	55.1	-22.6	Valve Adjustment: Opened Valve 1/2 to 1 turn
11	5/2/2023 09:40	33.6	22.8	8.2	35.3	-17.2	-16.5	56.8	-22.9	Valve Adjustment: Closed valve 1/2 to 1 turn
12	3/1/2023 09:27	61.0	39.0	0.0	0.0	-21.1	-21.1	67.1	-21.2	Increased Flow/Vacuum
12	3/7/2023 09:18	60.7	37.2	0.7	1.4	-21.1	-21.1	69.8	-20.9	Increased Flow/Vacuum
12	3/13/2023 08:45	60.5	39.2	0.3	0.0	-22.7	-22.6	44.3	-22.6	Increased Flow/Vacuum
12	4/3/2023 09:50	60.1	37.5	0.0	2.5	-22.5	-22.5	56.1	-22.6	Valve Adjustment: Opened Valve 1/2 to 1 turn
12	5/1/2023 10:15	57.8	37.6	0.0	4.5	-22.2	-22.2	52.2	-22.4	Valve Adjustment: Open Valve 1/2 to 1 turn
13	3/1/2023 09:47	60.7	38.3	0.3	0.7	-6.4	-11.9	64.1	-21.0	Increased Flow/Vacuum
13	3/7/2023 09:33	33.8	23.1	8.8	34.3	-19.5	-18.9	66.8	-21.0	Decreased Flow/Vacuum

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Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H2O)	Temp (F)	System Pressure ("H2O)	Comments
13	3/13/2023 11:10	55.5	35.6	2.2	6.7	-10.8	-14.3	49.4	-23.0	Increased Flow/Vacuum
13	4/3/2023 10:05	59.5	38.4	0.1	2.1	-20.7	-21.2	57.1	-22.5	Valve Adjustment: Opened Valve 1/2 to 1 turn
13	5/1/2023 08:45	58.7	39.3	0.0	2.0	-21.9	-22.1	54.7	-22.4	Valve Adjustment: Open Valve 1/2 to 1 turn
14	3/1/2023 09:04	64.4	34.0	0.6	1.0	-18.8	-21.0	69.9	-21.1	Increased Flow/Vacuum
14	3/7/2023 08:56	65.0	34.5	0.6	0.0	-21.0	-21.0	72.4	-20.9	Increased Flow/Vacuum
14	3/13/2023 08:27	48.5	27.9	5.2	18.4	-22.5	-22.5	43.4	-22.6	No Change
14	4/3/2023 09:32	64.1	33.9	0.0	2.0	-22.7	-22.5	53.6	-22.6	Valve Adjustment: Opened Valve 1/2 to 1 turn
14	5/1/2023 08:54	61.3	37.3	0.0	1.4	-22.3	-22.4	57.8	-22.4	Valve Adjustment: Open Valve 1/2 to 1 turn
15	3/1/2023 09:18	61.3	38.6	0.1	0.0	-20.9	-21.0	67.3	-21.1	Increased Flow/Vacuum
15	3/7/2023 09:11	42.4	28.9	5.9	22.8	-21.0	-21.0	68.4	-21.0	Decreased Flow/Vacuum
15	3/13/2023 08:31	58.6	38.0	1.3	2.1	-22.6	-22.6	46.3	-22.6	Increased Flow/Vacuum
15	4/3/2023 09:42	59.4	38.1	0.0	2.5	-22.6	-22.5	54.6	-22.5	Valve Adjustment: Valve completely open
15	5/1/2023 10:10	57.0	38.9	0.0	4.2	-22.2	-22.2	52.5	-22.3	No Change, Fully Open

